

UVa Program for common (eRD6 / eRD3) generic detector R&D for EIC Forward Tracker GEMs

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R&D Program @ UVa: Overall plans

▪ Forward GEM detectors

- Complete the study of stereo-angle (U-V) 2D readout strips
- Zebra connectors + adapter: No connectors mounted on detector \Rightarrow all FE contacts on outer radius side
- Pursue the study of new assembly technique \Rightarrow with O-ring and light and strong material bolts ...

▪ R&D on GEM like structures

- Pursue the study of Thin Chromium Cr-GEM \Rightarrow test performances in high rate, long term stability etc ...
- Test new GEM-like structures such as resistive μ -well detectors \Rightarrow basic performances on small 10x10 prototypes

▪ Front-end Electronics for EIC FT GEMs

- Study performance of VMM electronic (ideally with VMM3 chip) with application for large FT GEM for EIC
- Interface the VMM3 electronic with SRS readout system and DAQ currently used for APV25 at UVa

▪ Funding request for the remaining 2 cycles

- Support for UG students [5 K\$]
- Materials: [35 K\$]
 - GEM parts & accessories: readout board + frames [18 K\$] + accessories [2 K\$] (current cycle, July 2016)
 - Electronics: VMM FE cards + SRS components [10 K\$] (next cycle, July 2017)
 - New structures: thin Cr-GEM foils and resistive μ -well [5 K\$] (next cycle, July 2017)
- Travel support [6 K\$]

R&D Program @ UVa: Tentative timeline

▪ July – December 2016

- Acquire small (10 cm x 10 cm) U-V readout board with zebra connection scheme
- Finalize the design and place the order of the full size readout board, Zebra adapter card
- Investigate alternative options for GEM frames and finalize the design for new assembly technique
- Continue work with thin Cr-GEMs

▪ January – June 2017

- Build 1-m long prototype with the common GEM foil
- Acquire a few samples of VMM chip electronic for test with GEMs and set it up the SRS readout
- Prepare for a test beam campaign (at FNAL second half of the year)
- Continue work with thin Cr-GEMs

▪ July – December 2017

- Test the prototype in FNAL test beam, ideally together with the Florida Tech and Temple U. groups
- Test thin Cr-GEM and resistive μ -well detector in FNAL test beam.
- Analyse data from test beams, present the results at conference (like IEEE-NSS) and publish in peer-review paper
- Generic R&D for forward tracker will be considered completed at this point.